

# **Franklin County Board of Health**

## **Integrated Mosquito Management Plan**

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**Submitted by the Franklin County Board of Health**  
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## Introduction

Ohio local health districts have a statutory responsibility to protect those within their health district from infectious diseases, including West Nile Virus, Lacrosse Encephalitis, St. Louis Encephalitis, and other vector-borne diseases. This includes the responsibility to manage the mosquito population to reduce health risks to residents of the county.

To meet this responsibility, the Franklin County Board of Health redesigned the mosquito program in 2004, implementing an integrated approach to effectively and economically reduce nuisance and human health risks from disease carrying mosquitoes. In 2005, FCBH will continue to refine the program and adapt to fit the health and quality of life needs of the communities we serve.

## Purpose

The purpose of this integrated mosquito control plan is to protect the health, safety, and welfare of the citizens within Franklin County. This plan is designed to present a balanced approach to mosquito management which considers the human health and environmental risks associated with mosquito management activities compared to quality of life issues and human health risks from vector borne diseases in the mosquito population.

## Program Goals

The goals of the mosquito control program are to reduce the risk of vector borne disease transmission from mosquitoes and to protect the health and quality of life of Franklin County citizens. These goals will be attained through an integrated approach to mosquito control and management.

### Program Priorities

As a publicly funded program, it is important to prioritize the mosquito control efforts to have the best chance of meeting the program goals in an efficient manner. Program activities will be prioritized according to the following guidelines:

1. **Reduce the risk of disease transmission** by focusing mosquito control activities in areas with high incidences of disease positive mosquitoes.
2. **Break the disease cycle** by targeting areas with high populations of known vector species.
3. **Address future risks** by monitoring and treating areas with high populations of potential vector species.

## Program Components

- Public Education -- *Giving residents what they need to know to protect themselves and reduce mosquito populations.*
- Surveillance -- *Collecting information about mosquito habitat and populations of mosquitoes to direct management activities*
- Source Reduction – *Identifying and eliminating juvenile mosquito habitat*
- Larval Mosquito Control -- *Applying chemical and biological agents to kill juvenile mosquitoes*
- Adult Mosquito Control -- *Applying chemicals to suppress adult mosquito populations*
- Biological Control -- *Encouraging habitat for species that prey upon or compete with juvenile and adult mosquitoes.*

## **Methods**

An integrated approach to mosquito management uses knowledge of the life cycle and biology of the target mosquito species. The management tools include the balanced management of human activities, the environment, and chemical controls that are environmentally compatible and economically feasible to reduce pest and disease vector populations to an acceptable level.

### Public Education

Franklin County Board of Health's mosquito control education campaign will commence in April. The plan includes information about the FCBH program and how each community can eliminate mosquito breeding sites and reduce their risk of contracting a disease from mosquitoes.

The Public Information Officer (PIO) of the FCBH will coordinate public education with the assistance of the PIO or designated contact in each community. The FCBH mosquito control personnel will assist with distributing this public information and respond to questions asked by public officials and residents. FCBH personnel will also be available to attend community meetings.

The public outreach efforts will include:

- Information about mosquitoes and mosquito borne diseases.
- Information about personal protection measures which may help reduce biting incidents
- Information on prevention methods that can be undertaken in citizens' backyards to reduce or eliminate mosquito habitat.
- Requests for help from citizens to assist in the identification and elimination of breeding sites.

In addition, the following information will be provided to the designated contact in each community:

- Advisories regarding current surveillance information.
- Advisories and public notification prior to the initiation of disease vector control.
- Advisories on how to initiate personal protection of citizens, children and pets when ULV pesticide spraying is used for control.
- Information on the techniques, chemicals, and biological products used for mosquito control.

Information will be provided to local communities for distribution. FCBH will also make use of local newspapers and other media to disseminate educational information to the public. FCBH will maintain a portion of its website for mosquito control program information and general information about mosquitoes and disease. The FCBH mosquito BITE line will be available for community members to log complaints about mosquito problems and make inquiries about the program.

### Surveillance

A good surveillance program is essential to provide information for program management activities. FCBH will be conducting four types of surveillance: habitat identification, Adult *Culex spp.* collection with gravid traps, *Ochlerotatus triseriatus* egg collection, and nuisance complaints. In previous years FCBH used dead bird collection and testing. This surveillance method was discontinued in 2004.

#### *Habitat Surveillance*

The safest and most cost-effective method to control mosquitoes is to identify juvenile habitat sites and eliminate them when possible. FCBH personnel will scout areas to identify potential juvenile mosquito habitat. This information will be coordinated in a GIS database to facilitate management.

Citizens will be asked to call the FCBH and report areas that they believe are harboring mosquitoes. Naturally or artificially created habitats hold water continuously for a period of four days or longer. FCBH staff will investigate complaints and work with landowners to correct any problems found.

Habitat surveillance is an ongoing process. In cases where arbovirus positive pools of mosquitoes are identified in nearby traps, more effort will be spent on habitat surveillance and reduction.

### *Adult Mosquito Trapping*

Adult mosquito surveillance will be performed from May through September using gravid traps that are effective at capturing *Culex spp.* mosquitoes, the primary mosquito vectors for West Nile Virus. Adult traps are set in the evening and pulled the following morning. Trap placement will be on public and private property. The locations of these traps will not be publicized. Trap contents are processed and delivered to ODH Vector Borne labs for virus testing. FCBH will set traps weekly to provide information on virus activity and mosquito population dynamics throughout the communities we serve.

### *Egg Collections*

Collections of eggs from *Ochlerotatus triseriatus* and other woodland, tree-hole breeding species will be collected with oviposition traps. Unlike gravid traps, which require battery power and must be collected in early morning, oviposition traps are small, passive, and unobtrusive. The oviposition traps will be placed in woodlots around the county and sampled as needed to collect eggs. The trap contents will be reared by FCBH to 4<sup>th</sup> instar larvae or older, then submitted to ODH for testing. After test results indicate the possibility of a LaCrosse Encephalitis locus, eggs from the traps in that area will be reared for species identification prior to testing.

### *Complaint Surveillance*

Complaints of mosquito activity reported by residents can be a valuable surveillance tool. They can indicate possible source habitat that may not be easily found during routine road-based surveillance. A complaint call is an excellent opportunity for public education. The caller can be made aware of the efforts of this program, and also could look for source habitat in and around their residence, which can result in effective larval habitat control by the resident.

Complaints can also be used as a measure of perceived and real program effectiveness. Complaint information can be compared to landing counts and trapping numbers to help in determining the level of control the residents desire.

### *Dead Bird Surveillance*

Surveillance of dead birds has been a very useful indicator of the spread of West Nile Virus across the nation. West Nile Virus has now been identified in 48 states. As the virus is currently present in the county, FCBH is more interested in identifying and controlling populations of mosquitoes that are carrying the disease. Data collected from dead bird reports in recent years has been expensive and has yielded little useful information for mosquito control. FCBH is instead increasing the focus on other aspects of the mosquito control program.

## Habitat Reduction

Habitat reduction is the most effective and permanent method of controlling nuisance mosquitoes and reducing the numbers of potentially disease causing mosquitoes. The information collected from the source surveillance efforts will be used to coordinate with landowners to eliminate juvenile mosquito habitat where possible.

Landowners with sites identified as candidates for elimination will be contacted and provided information about source reduction and contacts with other agencies where appropriate. Sites where elimination of the habitat is not an option will be evaluated for treatment and placed on a continuing monitoring program.

While the main focus of this program will be voluntary compliance, sites that are harboring mosquitoes or other vectors create a public nuisance and can be subject to abatement orders or other regulatory action.

## Larval Mosquito Control

Larval mosquito control can be effective in suppressing the numbers of mosquitoes when large areas of larval habitat can be treated, such as applying biological larvicides to a marsh. In residential areas, the habitat is fractured into numerous small features and the target treatment area can have several different owners. Coordinating wide-scale effective treatment in these areas is impractical. Larviciding can still provide some small measure of reduction in many areas, and provides immediate mosquito control for habitat that will soon be eliminated.

When a site has been identified as larval habitat but cannot be eliminated, larval mosquito control will be performed where possible. FCBH personnel will apply appropriate pesticides to eliminate mosquito larvae. On private land, a mosquito control release form will be obtained prior to treatment. The site will be monitored periodically for mosquito presence and appropriate control measures will be used when needed.

## Adult Mosquito Control

Adult mosquito control done properly can result in a 90% or more reduction in trap catch in the area treated. Still, adult mosquito control is a costly method of mosquito management. It is to be used only when other control measures are insufficient to control the mosquito population, or when a significant percentage of adult mosquitoes sampled are positive for arbovirus.

Adult mosquito control consists of the application of an ultra-low volume mist delivered by truck mounted equipment. Application is conducted to correspond with mosquito host-seeking behavior in order to be most effective. The mosquitoes of primary concern for public health and welfare are in the genera *Aedes* and *Culex*.

These mosquitoes typically are most active (seeking hosts) from 30 minutes before sunset to two hours after sunset and two hours before sunrise to 30 minutes after sunrise. Whenever possible, adult control should occur during these times to be most effective.

### -- Target Adulticiding Timeframes --

Night:	June 21 <sup>st</sup>	September 30 <sup>th</sup>	
Sunset:	9:04 PM	7:17 PM	Evening Shift
Twilight* Ends:	11:07 PM	8:47 PM	
Twilight Starts:	4:00 AM	5:57 AM	Morning Shift
Sunrise:	6:03 AM	7:27 AM	

\* Astronomical Twilight

Adult mosquito control will only be conducted in response to adult trap data or in response to public health considerations. The decision to fog an area will be based on the program priorities listed in the goals section. Mosquito populations fluctuate naturally throughout the season. Field data indicating a significant and inordinate increase in population of mosquitoes in one area, or a high percentage of disease positive mosquitoes in one area, will trigger an increase in surveillance and larval control and a review of adulticiding options.

To be effective, the treatment must be conducted as soon as possible after collection of trap data indicating a need for treatment. Public notice will be provided 24 hours prior to fogging.

### *Do Not Spray Registry*

Residents with special concerns who would like to be excluded from adulticiding must contact FCBH to be placed on the Do Not Spray list each year. FCBH will also maintain a Call Before Fogging list for residents who wish to have additional notice of fogging activity in their community.

FCBH will make a good faith effort to exclude each registrant's property by stopping adulticide spraying from trucks within 150' of either side of the registrant's property. This does not apply to treatments conducted as a response to a public health emergency as determined by the Health Commissioner.

The Do Not Spray registry is public information. FCBH will make listings and/or maps of registered locations (without names and telephone numbers) available to the public through the Internet and by other means. This will allow registrants to verify their status. It will also help inform households that are affected by the registry about their status. Names and other information may be available to the public via open records laws. The "no-spray" area not only excludes the registered property from adult mosquito control, but also some neighboring properties. Registrants should consider the effect of their decision on their neighbors.

FCBH maintains a list of registered apiaries provided by the Ohio Department of Agriculture Division of Plant Industry, Apiary Section. The listed location of the apiary is added to the Do Not Spray registry as a courtesy and to provide an added margin of safety for apiaries. Beekeepers that need to update their information with ODA mid-season are asked to contact FCBH as well to ensure proper inclusion in the Do Not Spray registry.

### Biological Control

FCBH will encourage the use of biological control in mosquito management as much as possible. Effective biological controls for mosquitoes are habitat management strategies that make the environment inhospitable to mosquitoes. Biological controls also include management of the habitat to encourage any organism that preys upon mosquitoes or competes with them for habitat. Examples of these organisms include surface feeding fish, predatory mosquito larvae (*Toxorhynchites spp.*), and other aquatic invertebrates.

Biological control methods include the direct introduction of these species and management of habitat to encourage use by these species. Much of this activity is beyond the capacity of FCBH. Residents wishing to stock fish or create habitat for birds or bats will be referred to other agencies that can provide technical assistance.

## **Coordinated Programs**

Communities with their own staff and equipment for mosquito control are encouraged to coordinate their efforts with FCBH. FCBH will provide surveillance information and program direction for management activity. The community will gain the benefits of a research-based, integrated management program while providing their residents with a high level of service.

FCBH can provide identification of areas to be targeted for increased larval surveillance, adulticiding routes based on adult surveillance data, and program tracking and evaluation in reciprocity for local implementation of this plan.

It is of critical importance that any community that is receiving mosquito control services or is coordinating with FCBH not undertake any additional control measures. This plan is structured to provide research-based mosquito management. Additional control activities are not compatible with this plan and will impact the data collection that is the foundation for management decisions.

Unplanned activity will disrupt the surveillance program and could increase the risk of disease to residents in the target area and in adjacent areas. Communities engaging in unplanned activities will be assumed to have established their own mosquito control program.

If a particular community has established their own mosquito control efforts, FCBH's primary functions in that community will be public education and guidance

in regard to that community's program. Questions or complaints regarding mosquito activity in the community will be referred to the community contact person.

## **Research**

According to the American Mosquito Control Association, "the research element of the program has to keep pace with the operational element. There will always be a need or a desire to know more about the dynamics of the mosquito species and conditions in the control zone." More information of higher quality will allow the mosquito control program to be more efficient and effective in future years.

Building on information collected during previous seasons, FCBH is implementing a pilot program of early-season larviciding in a target area to evaluate its effectiveness in reducing late-season adult populations and WNV incidence rates in the mosquito population. This information will provide insights into the population dynamics and distribution characteristics that will allow for more effective control.

The program will also continue to build capacity for research in future years, both in the field and in the laboratory by building lab capacity, collecting data on population dynamics, distribution, virus activity, and human epidemiological risk assessment.

## **Special Concerns**

### Disease Outbreak

The activities under this program are structured to reduce the chance of arbovirus disease outbreak in the human population. The primary goal of this program is to prevent such an occurrence. Despite our efforts, there is always a possibility that a human outbreak of WNV or other mosquito-borne disease could occur. In the event of a critically high infection rate in the mosquito population, or several human cases of WNV or other arbovirus, FCBH will coordinate with the Ohio Department of Health to respond in an appropriate manner as prescribed in the State WNV plan. This response may include issuing public health warnings, increased larval and adult control, or pesticides applied from aircraft. Every effort will be made to inform and coordinate activities with the local communities.

### Emergency Response

Floods or other natural or human-induced disasters can create conditions where mosquito and other arthropod populations can have a negative impact on public health. This impact may be from possibility of increased disease transmission, or nuisance levels of arthropods inhibiting post-disaster response.

In the case of severe flooding, mosquito landing counts can exceed 100 per hour. This level of host-seeking behavior can create situations that are dangerously distracting to emergency response personnel and residents involved in cleanup. Some

species of mosquitoes exhibit host-seeking behavior during the day, and it may be necessary to apply ULV insecticides during times of heightened activity to reduce populations of these species.

After many disasters, there are solid waste cleanup issues. The accumulation of damp organic matter (garbage) can result in increased populations of flies. Flies can carry and transmit *salmonella*, *staphylococcus*, pathogenic strains of *E. coli*, and other disease causing organisms in their saliva and feces, and on their feet. This can contaminate food supplies and cause human illness. The equipment and techniques typically used for mosquito control are rapidly adaptable to respond to fly and other arthropod control, and FCBH will coordinate with the appropriate agencies to mitigate risk and alleviate nuisance when appropriate.

## **Evaluation**

A successful integrated mosquito management plan is one that is accepted by the community and reaches the goals of reducing the risk of vector borne disease transmission from mosquitoes and improves the quality of life for Franklin County residents through nuisance mosquito management. The plan will keep pace with planned objectives and be flexible enough to withstand unexpected changes and seasonal variation

A quality program will remain as a “work in progress,” because program directors and participants will continue to learn by experience. A formal evaluation will occur during the off-season by the Franklin County Board of Health mosquito program staff. Public forums or community input may be used for evaluation purposes. Evaluation results will be used to modify the plan for future seasons.

## **Future of the Program**

The FCBH mosquito management program has been developing and adapting to the needs of the community, and will continue to do so. FCBH will continue to apply and refine the science behind the management program to be responsive to disease issues. In the future, FCBH hopes to develop a coordinated plan that will address mosquito management in a cost efficient and effective manner countywide.

## **Conclusion**

This mosquito control plan is designed to promote and protect human health and the environment. The focus of this plan is to collect and use the best information possible to make effective mosquito management decisions, and inform and motivate the public to become involved in mosquito control.

The plan takes a proactive approach to mosquito management, working to identify trends in the mosquito populations that will allow for appropriate management activity before a problem occurs. Implementation of this plan will improve the quality of life and help to protect residents from vector borne diseases.